Contents

Abstract

TODO

1 Problem statement

$(G,k) \in \Sigma^* \iff \exists(v_1, ..., v_m) \in V^* : (v_1 = v_m,\ \forall v \in V\ \exists i\ v = v_i,\ \forall i : (v_i, v_{i+1}) \in E,\ \sum\limits_{i=1}^{m-1} w(v_i, v_{i+1}) \leq k)$

2 Reduction rules

1. If (v_i, v_j) is a leaf ($deg(v_j) = 1$), then $G' := (V - \{v_j\}, E - \{(v_i, v_j)\}),\ k' := k - 2w(v_i, v_j)$
2. If (v_i, v_j) is a bridge, then $G' := (V - \{v_j\}, E - \{(v_i, v_j)\}) + \{(v_i, u) |\ u \in N(v_j)\}),\ k' := k - 2w(v_i, v_j)$
3. (???) (only for unweighted graphs) If v is an articulation point, $G' := (V - \{v\}, E - E(v) + \{(v_i, v_j) |\ v_i, v_j \in N(v),\ \forall path(v_i, v_j)\ v \in path\}),\ k' := k - 2r$, where r is the number of components in graph G after deleting v.
4. If $(v_1, ..., v_m)$ is a chain and $w(v_i, v_{i+1}) \geq w(v_j, v_{j+1}) \forall j$, than $G' = (V - \{v_2, ..., v_{m-1}\} + \{v_i, v_{i+1}, E - \{(v_j, v_{j+1})\} + \{(v_1, v_i), (v_i, v_{i+1}), (v_{i+1}, v_m)\}),\ k' := k$

3 Kernel size

Theorem 3.1. *The kernel has a polynomial size due to F parameter.*

4 Kernel due to other parameters

Theorem 4.1. *There is no kernel of polynomial size due to [...] parameter(s).*

Idea: (unweighted case) given $(G_1, ..., G_n)$ connect them in a cycle. The new graph has a GTSP solution of length $\leq n + \sum_i |V(G_i)| \iff \forall i\ G_i$ has a hamiltonian cycle.

5 Literature

[1]